



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/719,014

11/24/2003

Nikolai N. Issaev

08935-291001 / M-5027

9164

26161 7590 10/10/2007
FISH & RICHARDSON PC
P.O. BOX 1022
MINNEAPOLIS, MN 55440-1022

EXAMINER

TALBOT, BRIAN K

ART UNIT

PAPER NUMBER

1792

MAIL DATE

DELIVERY MODE

10/10/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/719,014

Applicant(s)

ISSAEV ET AL.

Examiner

Brian K. Talbot

Art Unit

1762

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37-CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 02 August 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20,22-25,27-34,37-39,41-50 and 52-60 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-20,22-25,27-34,37-39,41-50 and 52-60 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 02 August 2007 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

1. The amendment filed 8/2/07 has been considered and entered. Claims 21,26,35,40 and 51 have been canceled. Claims 58-60 have been added. Claims 1-20,22-25,27-34,37-39,41-50 and 52-60 remain in the application.
2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.
3. In light of the amendment filed 8/2/07, the objection to the Abstract has been withdrawn. Some of the 35 USC 112 rejections have been overcome as well as the 35 USC 102 rejection.

Specification

4. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

Claims are directed toward a method of making a cathode for a battery by coating and not directed toward a battery including coated aluminum components.

Claim Rejections - 35 USC § 112

Claim 36 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding claim 36, the term “leveling” is unclear. Clarification is requested. Applicant is directed to claim 22 for response.

Claim Rejections - 35 USC § 103

5. Claims 1-20,22-25,27-34,37-39,41-50 and 52-60 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takeuchi et al. (5,543,249) in combination with Michel et al. (2004/0264110) further in combination with Tischer et al (“Candidate materials for the sulfur electrode current collector”, Corrosion Science, Vol. 26, No. 5, pp. 377-388, 1986) (a) alone or (b) further in combination with Sakamoto et al. (6,447,957).

Takeuchi et al. (5,543,249) teaches an aqueous blended electrode material for use in electrochemical cells and manufacture. Takeuchi et al. (5,543,249) teaches forming cathode powder mixture, spreading onto an expanded metal grid and calendaring to form the cathode laminate. The laminate is then heated and cut to size and rolled to final thickness (Fig. 2 and col. 3, line 25 – col. 4, line 5). The cathode active material includes, fluorinated carbon, manganese dioxide, iron disulfide, etc (col. 2, lines 40-58). A polymer binder is added to the cathode active material as well as the carbon material to form the cathode active material. The expanded metal screen or grid is preferably aluminum (col. 3, line 45). Takeuchi et al. (5,543,249) teaches that slurry application is also known (col. 1, line 25-55).

Takeuchi et al. (5,543,249) fails to teach a current collector that includes pulling the grid having a initial tensile strength and increasing the tensile strength by the pulling step.

Michel et al. (2004/0264110) teaches electrodes and production thereof whereby a aluminum current collector is stretched prior to application of a cathode active material ([0013]-[0026] and [0036]). The perforations (5) are square or diamond shaped as depicted in Figs. 2-5.

Therefore it would have been obvious to have modified Takeuchi et al. (5,543,249) battery to include a current collector that is pulled prior to coating with the cathode active material as evidenced by Michel et al. (2004/0264110) with the expectation of achieving the benefits associated therewith, i.e. increased surface area and tensile strength.

Takeuchi et al. (5,543,249) in combination with Michel et al. (2004/0264110) fails to teach a tensile strength of the pulled grid to be greater than 5 lb/in as well as the claimed 6061 aluminum alloy grid.

Tischer et al ("Candidate materials for the sulfur electrode current collector", Corrosion Science, Vol. 26, No. 5, pp. 377-388, 1986) discloses a positive current collector for a battery comprising a 6061 aluminum alloy (See Introduction and Table 1). Examiner's note: A 6061 aluminum alloy has the following properties: tensile strength of 18100 psi, yield strength of 7980 psi, and a resistivity of 3.7e-006 ohm-cm.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Takeuchi et al. (5,543,249) in combination with Michel et al. (2004/0264110) battery to include a current collector that includes an aluminum alloy that is a 6000 series aluminum alloy including 0.04-0.4% by weight of chromium, 0.01-6.8% by weight of copper, 0.1-7% by weight of magnesium, 0.15% or less by weight of manganese, and 0.4-0.8% by weight of silicon; an aluminum alloy including 0.15-0.4% by weight of copper, 0.7% or less by weight of iron, 0.8-1.2% by weight of magnesium, 0.1% or less by weight of titanium,

and 0.25% or less by weight of zinc; a current collector that has a yield strength of at least 2.0 lb/in; a current collector that has a yield strength of at least 5 lb/in; a current collector that has a tensile strength of at least 5 lb/in; a current collector that has a tensile strength of at least 7 lb/in; a current collector that has a yield strength of at least 2.0 lb/in and a tensile strength of at least 5 lb/in; a current collector that has a resistivity of less than 10 mΩ/cm; and a current collector including a 6061 aluminum alloy as evidenced by Tischer et al ("Candidate materials for the sulfur electrode current collector", Corrosion Science, Vol. 26, No. 5, pp. 377-388, 1986) in order to utilize an aluminum alloy that is highly corrosion resistant even at high temperatures.

With respect to the leveling, it is the Examiner's position that when the collector is stretched it also is leveled.

(b) Takeuchi et al. (5,543,249) in combination with Michel et al. (2004/0264110) further in combination with Tischer et al ("Candidate materials for the sulfur electrode current collector", Corrosion Science, Vol. 26, No. 5, pp. 377-388, 1986) fails to teach diamond-shaped perforation in the current collector.

Features detailed above are incorporated here concerning Takeuchi et al. (5,543,249) in combination with Michel et al. (2004/0264110) further in combination with Tischer et al ("Candidate materials for the sulfur electrode current collector", Corrosion Science, Vol. 26, No. 5, pp. 377-388, 1986) (a) alone or (b) further in combination with Sakamoto et al. (6,447,957).

Takeuchi et al. (5,543,249) in combination with Michel et al. (2004/0264110) further in combination with Tischer et al ("Candidate materials for the sulfur electrode current collector", Corrosion Science, Vol. 26, No. 5, pp. 377-388, 1986) (a) alone or (b) further in combination

Art Unit: 1762

with Sakamoto et al. (6,447,957) fails to explicitly teach diamond-shaped perforation in a current collector.

Sakamoto et al. (6,447,957) teaches diamond-shaped perforations in a current collector (abstract and Figs. 1-3).

Therefore it would have been obvious for one skilled in the art at the time the invention was made to have modified Takeuchi et al. (5,543,249) in combination with Michel et al. (2004/0264110) further in combination with Tischer et al ("Candidate materials for the sulfur electrode current collector", Corrosion Science, Vol. 26, No. 5, pp. 377-388, 1986) process by including diamond-shaped perforation in the current collector as evidenced by Sakamoto et al. (6,447,957) with the expectation of achieving similar success.

Response to Amendment

6. Applicant's arguments with respect to claims 1-20, 22-25, 27-34, 37-39, 41-50 and 52-60 have been considered but are moot in view of the new ground(s) of rejection.

Applicant argued that the pulled expanded metal grid did not have diamond-shaped perforations and a tensile strength greater than 5 lb/in.

The Examiner disagrees. As detailed above Michel et al. (2004/0264110) teaches the diamond-shaped perforation and stretching the grid prior to coating. Sakamoto et al. (6,447,957) also teaches diamond-shaped perforations in current collectors. It is the Examiner's position that

Art Unit: 1762

this stretching would produce the claimed tensile strength since the aluminum grid is the same in the prior art as in the instant invention.

7. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).


A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brian K. Talbot whose telephone number is (571) 272-1428. The examiner can normally be reached on Monday-Friday 6AM-3PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy H. Meeks can be reached on (571) 272-1423. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 1762

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

 10/2/07
Brian K Talbot
Primary Examiner
Art Unit 1762

BKT